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Stand of Messmate Stringybark and Manna Gum—Mt. Cole State Forest.

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The Victorian Naturalist

Editor: **G. M. Ward**
Assistant Editor: **P. Gahan**

Vol. 86, No. 1 **9 January, 1969**

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Front Cover:

Graham Pizzey photographed the beautiful Little Egret shown this month. It may be seen near swamps or the edges of lakes, and is distributed fairly generally along the eastern part of Australia.

Readers' Nature Notes and Queries

These columns are available for all members, young and old, to bring before others their own observations in nature. Correspondence may be sent to the Editor, 54 St. James Road, Heidelberg.

Here is the final note from Victor Jacobs describing places visited.

Lysterfield Reservoir

From the east road it was simple to walk on the bare lake margin from which the water had receded during the long dry spell. It was March 1967, and there were no squashy hummocks to retard our progress, and no close growing melaleucas and tangled blackberries to bar our movements. Instead, there was a firm, smooth, nearly dry mud shore, carpeted by the desiccated remains of water weed. With our backs to the lake margin we could see, at eye level on the marginal melaleucas, a wide high-level marker band of this same water weed.

There were many aquatic birds, but suspicious and cautious in mood as they anticipated our movements; and they kept their distance whether on the open water or beside the margin. The following were recorded:

90 to 100 Coots, 12 Black Ducks, 1 male Musk Duck, 2 White-faced Herons with a young one, 1 White Egret fishing, 3 Spur-winged Plovers, many Eastern Swamp Hens (flushed from the scrub bordering the water), 1 adult Crested Grebe shepherding three young ones across the water, and 12 Black Swans.

A Reed Warbler attracted us, not by its usual dynamic song but by flitting among the dry stems of the Reed Mace. Another joined it and they busied themselves hunting insects. They will probably soon migrate to their winter haunts.

Small birds coming from the marginal scrub, to fossick in the reeds, was a party of Blue Wrens.

Even though our walk had been facilitated by the open shore, a constant north wind left us a little weary, so lunch was taken in a shady spot.

We left the lake for our return journey. We pushed through the melaleuca belt, past the Red Gums (looking as unhappy in the dry as they had done in the wet), on to the slope where the Mahogany Gums looked healthy, and into a grove of venerable Narrow-leaved Peppermints. Here a young Crimson Rosella called, while a White-eared Honeyeater shared his tree. An inordinately loud rustling was caused by a pair of Blackbirds scouring the dry Mahogany Gum leaves that carpeted the forest floor. Where a Mahogany Gum branch had been pulled away from the trunk, a mass of gum had exuded. Two Grey-backed Silvereyes were pulling at and eating pieces of this gum. One flew off while the other remained. This bird had unusual markings—white patches on upper rump, wing tip and neck, plus a pink lateral stripe.

A handsome Golden Whistler in immaculate plumage called and was answered by his mate. Here too we saw a grey Thrush, a Yellow Robin and a small flock of White-naped Honeyeaters.

* * *

Having used my jottings to compile this series of short articles, I feel that I have overtaken unfinished business. It was not too difficult once the first words had been written. I hope sincerely that many other members will be able to follow suit; and thus use the *Victorian Naturalist* in a manner which is their right—a medium for the publishing of their observations in natural history.

Subscriptions Now Due

The Field Naturalists Club of Victoria is administered by a relatively small number of honorary office-bearers.

The growth of the club and the expansion of its activities, particularly in connection with the production of the *Victorian Naturalist*, are continually adding to the burden of work.

It is therefore requested that fees and subscriptions be paid as promptly as possible, in order to help lighten some of this burden. The financial year commences on the 1st January, 1969.

If you will not be paying your fees at one of the forthcoming general meetings, please remit them by post, using the form provided on the reverse side of this leaf.

This procedure will save office-bearers' time, and expense, in sending out reminder notices.

PLEASE ATTEND TO THIS MATTER NOW

You may help further by passing the following leaf on to an acquaintance who is not a member of the F.N.C.V. or a subscriber to the *Victorian Naturalist* but who might be interested in either.

NOTES:

1. Membership fees for the year 1969 are as follows:

Ordinary Members	$7.00
Country Members	$5.00
Joint Members	$2.00
Junior Members	$2.00
Junior Members receiving *The Victorian Naturalist*	$4.00
Subscribers to *The Victorian Naturalist*	$5.00
Affiliated Societies	$7.00
Life Membership (reduction after 20 years membership)	$140.00

(Ordinary, and country members receive the *Victorian Naturalist* free of any further charge.)

2. The scheme of supporting membership was introduced so that those who are able and willing to do so might help club finances. You are invited to become a supporting member by making a voluntary addition to the normal annual fee of any sum you choose, from $1 upward. Details relating to supporting members and their payments are regarded by the treasurer as confidential, and no distinction or extra privilege is bestowed on the members concerned.

(To be removed)

Field Naturalists Club of Victoria

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Yours faithfully,

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Book Review

Night Watchmen of Bush and Plain

by DAVID FLEAY

Published by Jacaranda Press Pty. Ltd. Brisbane

10" x 7", 163 pages. 17 colour and 99 half-tone plates, with Distribution Maps of Australian Hawk Owls inside front and back covers. Printed on high quality paper, with stiff cover and full colour dust-jacket. Price $5.50.

Beginning with his early teenage years in 1923 when a vocation in pharmacy appeared about to be thrust upon him; and culminating with the first breeding in captivity of the Powerful Owl in July 1968, is the subject to which David Fleay devotes the first five chapters of this book.

Written in his usual easy style, and dotted with humour, the author is able to convey to the reader his feelings as he was taken on his first trip to camp in the forests which lay within the triangle formed by the towns of Ballan, Blackwood and Daylesford.

Here, deep in the Korweingeboora forest, began the prelude to forty-two years of patient and painstaking study of the Powerful Owl.

In succeeding chapters, the reader tramps with the author over miles of rugged country; and spends both pleasant nights and nights of being cold, wet, muddy and miserable. But always there is an expectancy that the roosting site of the Powerful Owl is near. Right through these first five chapters, the reader is constantly aware of David Fleay's unflagging patience and determination to eventually breed captively, this wonderful and lordly bird.

In the remaining pages of the book, the reader is introduced to other species of owl including the Rufous Owl of the rain forests in northern Australia, the Barking Owl, the Boobook Owl, the Masked and Barn Owls, the long legged Grass Owl and the Sooty Owl. To complete the book, chapter thirteen is devoted to the Frogmouth and Nightjars.

Indeed, for this reviewer, *Night-watchmen of Bush and Plain* has been one of the most impressive publications on natural history during 1968. It is well written and illustrated, is authoritative in its text, and at the same time is able to be read and enjoyed by all age groups.

To quote from the author's introduction:

> . . . . Along the moonpaths and under the stars, in fact, there is a world of intense and abiding interest known to few but open to all.
>
> Be proud of things characteristically Australian, and do make sure for the sake of the future that children in particular treat them with the respect they deserve.

G.M.W.

Ecological Valence of Mountain Ash (*Eucalyptus regnans* F. Muell.) as a key to its distribution

G. Ross Cochrane*†

Abstract

The objective of this study was to test the hypothesis that, "knowing the environmental conditions necessary for the growth of a stenovalent species like mountain ash (*Eucalyptus regnans* F. Muell.) its distribution could be mapped accurately from analysis of the environment". If successful this could prove a relatively rapid method for mapping mountain ash vegetation.

Tests were carried out in the Dandenong Range in Victoria immediately after bushfires in January, 1962, made access, rapid traverses, and accurate identification of forest trees possible.

Further identification and measurement of environmental factors, particularly precipitation, temperature, insolation, cloud cover, wind velocity and direction, and soil depth, texture, and moisture were continued until mid-1965.

Distribution of *E. regnans* was checked against environmental conditions and the narrow ecological valence of this species showed it to be a useful indicator plant of a narrow set of habitat conditions.

The tested hypothesis was used to amend an earlier distribution map of *E. regnans* and other species in the Dandenong Range. The hypothesis was further tested, in 1964 and 1965, on a larger scale to determine distribution of mountain ash and other Eucalypts in the Otway Ranges, a rugged area of difficult access in Southern Victoria.

Field evidence in both the Dandenong and Otway Ranges supports the hypothesis that mountain ash occurs naturally wherever a narrow set of environmental conditions is present. These conditions include a moist environment with annual mean precipitation over 120 cm, absence of long periods of water stress, shelter from both strong cold and strong hot winds, free air drainage, and moist, deep, well-drained soils. The altitudinal range of the species is between 225-1300 m. Its narrow ecological tolerance proves to be a useful indicator of its expected distribution, not only for broad regional studies but also for recognizing smaller local patterns.

* Geography Department, University of Auckland, New Zealand

† Presented to the Botany Section of the 39th Conference for the Australian and New Zealand Association for the Advancement of Science, Melbourne, Australia, January 1967.

Introduction

Diversity of habitat in most forests and woodlands in Australia is characterized by different species of *Eucalyptus,* and only *Eucalyptus,* as the tree dominants. There is also a high degree of uniformity of morphology in this genus. In other continents over a comparable environmental range different genera, families, and even broader systematic groupings—as well as life-form differences—are characteristic of the tree component of forest and woodland communities.

Within the apparent uniformity of *Eucalyptus* vegetation large numbers of species are present (Blakely 1955; Wood 1959) and, wide variations in ecological valence occur (Pryor 1959). Some species tolerate a wide range of environmental conditions, others are intolerant of changes even to the micro-habitat. The latter plants are good indicators of specific micro-habitats. Broad ecological studies (Herbert 1929; Patton 1930; Carter 1946; Clifford 1953; Jacobs 1955; Gilbert 1958) and detailed autecological investigations (Powles 1937, 1940; Carr 1954; Ashton 1956, 1958; Cunningham 1957, 1960; and Teller 1957) show mountain ash (*Eucalyptus regnans* F. Muell.) to be stenovalent (i.e. to have a narrow ecological tolerance).

Mountain ash forests are found only

in Victoria and Tasmania, in relatively restricted areas where a narrow range of environmental conditions occur that favour their growth. When these conditions are understood it should be possible to find mountain ash whenever the set of conditions is repeated. In this study this hypothesis was investigated for areas in the Dandenong Range, near Melbourne, and in the Otway Ranges in Southern Victoria, and the distribution of mountain ash verified. An earlier map by Clifford (1953) showing distribution of *Eucalyptus regnans* in the Dandenong Range is amended.

Physical Characteristics

The Dandenong Range near Melbourne is an irregularly triangular-shaped range eight miles wide along its southern west-east aligned base and some eight miles in length along its main northeast-southwest axis. This upland area of largely dacite rocks (Morris 1913; Edwards 1955) rises steeply from the coastal lowlands to the west but is less steep on its south-eastern and eastern flanks. It reaches a maximum height of over 600 m at Mount Dandenong and at Burkes Lookout in the narrower northern apex. Average height of the divide is 540 m in the north and west and about 100 m lower in the south (Figure 1).

A broad central upland area of several square kilometres in area centered on Sherbrooke and containing the Sherbrooke Forest mountain ash reserve is a gently to moderately sloping area of deep krasnozem soils. Elsewhere shallower krasnozems and podzols occur similar to soils recorded in adjacent areas by Holmes, Leeper and Nicolls (1940). Skeletal soils are associated chiefly with toscanite outcrops on the lower western slopes of the Dandenong Range, but they also occur elsewhere. Mountain ash occurs only on the deep krasnozem soils.

The deeply dissected Otway Ranges in southern Victoria are much more extensive in area and are more heavily forested though not much higher in elevation than the Dandenong Range. Both areas have a humid, mesothermal (Koppen Cfb) climate. Mean annual rainfall, which varies from 90-125 cm in the latter range, is over 250 cm in the wettest coastal uplands of the deeply dissected, tilted, Jurassic sandstones, shales and siltstones of the Otways. In both areas rainfall increases from about 90 cm at 150 m to maximum values on windward upper slopes near 600 m elevation. Also temperatures are cooler, humidity higher, cloudiness greater, mists more frequent and rainfall effectiveness enhanced with increase in elevation. This parallels conditions recorded in the Mount Lofty Ranges in South Australia (Cochrane 1963). The main rain-bearing winds are from the south while strong, dessicating winds are chiefly from the north and west. These variations in climate with increasing altitude and with different aspects are reflected in the dominant tree associations (Cochrane 1968a).

Methods

Immediately following the disastrous bushfires of January 14-17, 1962, in the Dandenong Range, a field programme investigating (a) the area and degree of fire damage, (b) the distribution of Eucalypt tree species, and (c) the patterns of regeneration of trees and of understorey seral vegetation was initiated and continued at regular and frequent intervals until June, 1965. The influences of relief, aspect, insolation, precipitation, cloud cover, temperature, wind velocity and soil texture and soil moisture were observed to determine their effects upon vegetation distribution and regeneration.

Initially, whilst the areas were free

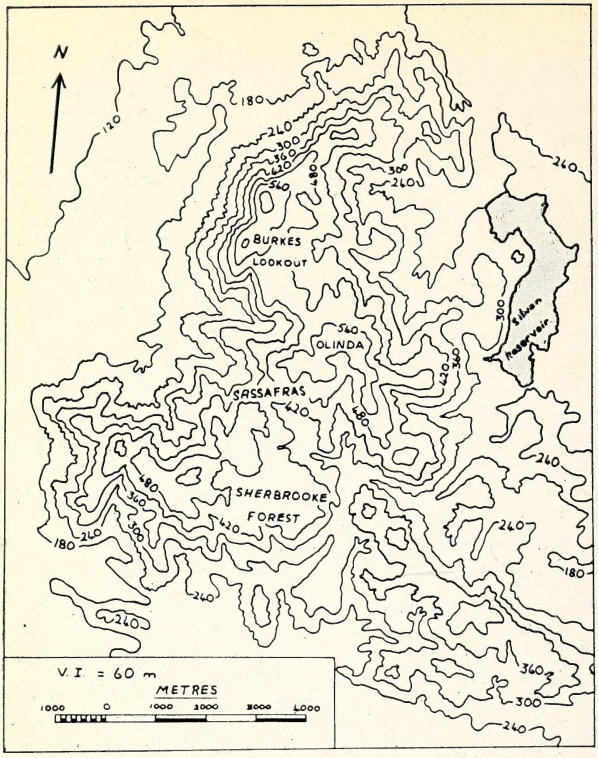

Figure 1

of undergrowth thereby allowing easy movement, a series of rapid traverses was carried out at 900 m intervals corresponding with the grid lines of the Victorian 1 : 50,000 Monbulk Sheet. This was soon modified to include traverses along ridges, crests, and valleys and around the contours at 150 m intervals. Maps at the scale of 1 : 7920 (1 inch to 10 chains) of the Dandenong Series and vertical air photographs at a similar scale, flown immediately after the bushfires, were used as base maps in all the later investigations.

Permanent quadrats, each of 100 m^2 (10 m on a side), were set up under different *Eucalyptus* tree communities and as the regenerating undergrowth vegetation became more dense, quadrats of 16 m^2 (each 4 m on a side) were used to record the characteristics of the understorey species.

Temperatures were recorded from a series of maximum-minimum thermometers, wind velocities from spot anemometers, and altitude of cloud base from a surveying aneroid altimeter. Other climatological information was interpolated from stations closest to the survey areas.

Soils were analyzed in the field for structure, depth, texture, pH, and moisture content at quadrat sites.

To further test the patterns that were recognized in the Dandenong Range detailed transects were recorded in the Otway Ranges during 1964 and 1965 in forest regenerated areas burned during the calamitous, virtually State-wide 1939 bushfires, and also in

areas that appeared to have escaped burning during the last 100 years. In addition to recording all plant species along the transects, the physical properties of the soil and the pH were tested at regular intervals within vegetation communities as well as at every break of slope and at each change of vegetation on a range of different aspects. These ground control transects were used for wider mapping from vertical air photographs.

Results

Several factors soon became obvious, however, only the first two factors noted will be discussed in this paper although the other factors are all directly or indirectly significant in the plant-environment interrelationships observed.

Firstly, field mapping showed anomalies in the dominant tree species distribution described by Clifford (1953). Secondly, the distribution of *Eucalyptus* species was closely linked to habitat. Thirdly, distribution of bracken, *Pteridium esculentum,* a rapid and aggressive initial colonizer of bare, forest-fired areas was closely related to precipitation totals and soil depth. It formed an important nursery cover for later species in the pyrosere. Fourthly, tree dominants, all of which were Eucalypts, displayed distinct regeneration patterns which varied with each different species (Cochrane 1966). Fifthly, regeneration patterns of understorey species were influenced by the canopy cover of the tree dominants (Cochrane 1968b). Recent investigations by Webb *et al.* (1967) also recognized the importance of canopy in the structure of Australian rainforests.

Discussion

The present author experienced more favourable circumstances for field investigations than were available to Clifford ten years earlier. The advantages included (1) relatively free access over difficult country for a few months when all the undergrowth had been razed by the January, 1962, bushfire (Figure 2). Clifford had been confined to roads and tracks with problems of identification when peering into dense stands, especially of tall clean-barked trees which could be one of several species. Also the dense undergrowth which was present when Clifford mapped the area, frequently masked lower trunks, retarded progress, and made it difficult to recognize shape and size of *Eucalyptus* leaves which were commonly 50 m above the ground. (2) Positive identification of tree species was possible from leaf defoliation caused by radiant heat from the forest-fire understorey fuel. Leaves carpeting the fire-cleared ground shortly after the bushfire facilitated exact identification even of individual trees. (3) Distribution patterns were confirmed later from the study of juvenile leaves when regeneration of *Eucalyptus* trees began three to six months after the fire.(4) Large scale, 1 : 7920, Dandenong Series maps were available for base maps along with 1961 and 1962 vertical air photographs of a similar scale. Clifford had to work with much less accurate base maps.

However, although he plotted his distributions on a small scale map where it was difficult to define exact boundaries, he also prepared a large scale relief model of the Dandenong Range and showed distribution of *Eucalyptus* species on this.

The most obvious differences observed between the present writer's field mapping and the pattern mapped by Clifford (1953) was in the distribution of two species, mountain ash (*Eucalyptus regnans*) and mountain grey gum, *E. goniocalyx*. Clifford's

Figure 2

map showed that there was a significant observable relationship between the distribution of *Eucalyptus* species and the topography in the Dandenong Range. In effect these distribution patterns resulted primarily from differences in aspect and rainfall totals with wet sclerophyll forest associations found on the moister, cooler, eastern and southern lee slopes and dry sclerophyll forest associations occurring on the drier, warmer, western flanks which were more exposed to insolation and strong dry winds.

Wet sclerophyll forest of almost pure stands of very tall (over 70 m) mountain ash was mapped by Clifford as occurring essentially on the eastern flank of the approximately northeast-southwest aligned main range in areas with 122 cm or more annual average rainfall and lower evaporation than on the western slopes. He also recognized their presence on southern slopes, between Sherbrooke and Belgrave, sheltered by land configuration from western and northern winds (Figure 3). Two very small localized areas in sheltered sites near roads were also mapped on the western flanks, west of Sassafras. Another wet sclerophyll forest tree, mountain grey gum, occurred chiefly at lower elevations than mountain ash in areas with less than 122 cm precipitation essentially on the sheltered eastern lee where it was free from the frequent, high-velocity, dessicating northerly and north-westerly winds present on the westerly flank of the range. It also occurs on the western and northern slopes mainly in moist sheltered valleys in combination with species of the dry sclerophyll forest (Figure 2).

On the western and northern flanks dry sclerophyll forest associations of stringybarks (*E. obliqua, E. macrorrhyncha, E. baxteri*), box (*E. elaeophora, E. melliodora*), and peppermint (*E. radiata*) prevail with lesser

continued on p. 19

A New Species of Ray of the Genus *Urolophus* (Elasmobranchii : Urolophidae) from Victoria

by Joan M. Dixon*

Summary

A new species of ray, *Urolophus paucimaculatus* from Victorian waters is recorded and described. Some observations are made on the distribution and breeding of this species.

Introduction

On 2nd May, 1967, the author collected a number of ichthyological specimens in Westernport Bay, Victoria and, amongst the sample of urolophids, found specimens which could not be identified. The most distinctive features of these were the presence of a few white spots on the upper surface of the disc, and the unusual arrangement of the nasal apparatus. From a search of the literature, it appeared that this was indeed a new species, and attempts were made to gather additional material. A number of specimens were collected, and material already held in the collections of the National Museum of Victoria was examined.

Materials and Methods

Specimens were collected by various methods, some by hand, some by trawling and others were netted. They were fixed for a few days in 10% formalin, then washed and stored in 70% alcohol.

The description of the species is based on National Museum of Victoria registered specimens, A 334 holotype and A 335-A 349 paratypes. Specimens R 13351-R 13356 and A 350 were examined. Measurements made on the type series are based mainly on the methods of Hubbs and Ishiyama (1968). They are point to point determinations and are measured in millimetres.

Systematic Account

Class—Elasmobranchii

Family—Urolophidae

Genus *Urolophus* Müller and Henle, 1837

Ber. Verh. K. Pr. Akad. Wiss. Berlin, 1836 (1837), p. 117

Type species, *Raja cruciata* Lacépède

Urolophus paucimaculatus sp. nov.

Plates I-III, Table I

Material. Holotype: Male, total length 366 mm., National Museum of Victoria registration No. A 334, collected by A. O. Yateman in a 6″ strand monofilament net in 40 fathoms in Bass Strait, approximately 13 miles off Cape Patton, Victoria, 28th September, 1968.

* Curator of Vertebrates, National Museum of Victoria.

Paratypes: 8 females and 6 males, National Museum of Victoria reg. nos. A 335-A 349 as follows:

A 335 male, t.l. 338 mm. netted in 40 fathoms off Cape Patton 28th September, 1968, coll. by A. O. Yateman.

A 336 male, t.l.	385 mm.	
A 337 female, t.l.	463 mm.	
A 338 female, t.l.	142 mm.	Young of A 337
A 339 male, t.l.	138 mm.	
A 340 male, t.l.	130 mm.	
A 341 male, t.l.	133 mm.	
A 342 female, t.l.	135 mm.	
A 343 female, t.l.	133 mm.	

Netted in 20 fathoms, 5 miles south-east of Zeally Point, Torquay, Victoria, 6th October, 1968, by A. O. Yateman.

A 344 female, t.l.	308 mm.	
A 345 female, t.l.	330 mm.	
A 346 male, t.l.	111 mm.	Young of A 345
A 347 male, t.l.	102 mm.	

Collected in otter trawl in 2 fathoms, in Hann's Inlet, between Sandy Point and Tortoise Head, Westernport Bay, Victoria, from Fisheries and Wildlife boat "Caprella", 2nd May, 1967 by J. M. Dixon.

A 348 male, t.l. 358 mm. Collected (by hand) off Kirk Pt. Port Phillip Bay, Vict. 1st October, 1967 by T. Muir.

A 349 male, t.l. 353 mm. Collected in 3 fathoms off Torquay, Vict. 19th July, 1968 by R. Milliken.

Other material examined. Nat. Mus. Vict. specimens reg. nos. R 13351-R 13356 from Fisherman's Bend, Vict. 2nd May, 1932, and A 350 from west of Lakes Entrance, Vic. 17th March, 1948. Coll. by A. Dunbavin Butcher.

Diagnosis. This species is most easily distinguished from other urolophids by the presence of a few small white spots on the upper surface of the disc, and by the shape and arrangement of the nasal apparatus. (Plates I-III).

Description. (For measurements of holotype, see Table I).

Disc broader than long, anterior lateral margins slightly angled, posterior border rounded. Snout produced into small sub-acute rostrum, behind it occur numerous dorsal pores. Distance between snout and mid-cloaca slightly exceeds distance from mid-cloaca to end of tail.

Tail dorso-ventrally flattened, stout at base; tapers gradually into spatulate, rounded caudal fin. Prominent lateral ridge arises just behind base of tail, becomes most evident half way along length of tail and obscure at about level of caudal spine. Spine stout, well defined, covered with skin in young specimens, bears 17-25 backwardly directed, slightly curved narrow teeth in older specimens. Pelvic fins widen gradually from insertion to rounded lateral margins, moderately acute on inner posterior border. No dorsal fin.

Orbits raised conspicuously above level of disc.

Spiracles roughly triangular, wider

behind than in front, anterior edge almost level with front of eye, posterior edge curves medially around hinder rim of orbit.

Nasal curtain in shape of a broad bell. Rounded antero-lateral margins almost fill nostril when depressed. Lobes of curtain asymmetrical, right lobe closes nostril more completely than left. Postero-lateral edges extended into small rounded processes projecting beyond hind border of curtain. Frenum mildly fimbriate, left and right sides divided by median notch at junction with nasal septum. Postero-lateral margin of nostril has characteristic inwardly directed prominence. Cavity of nostril bordered at rear by fleshy lobe which accommodates expansion of nasal curtain.

Mouth has small labial folds, lower lip shows a median shallow depression; skin behind lower lip pleated into several longitudinal folds.

Papillate maxillary velum in throat. Inside mouth, behind lower lip lies a series of small buccal processes which may divide into about six club-shaped extremities.

Teeth showing sexual dimorphism. Male with two distinct tooth types, undifferentiated, flat rhomboidal ones laterally, and sharp semi-triangular backwardly pointed ones towards mid line in both jaws. In females, teeth regularly arranged, rhomboidal, pavement-like with small transverse keels having slight backwardly projecting tips.

Colour. (Described from freshly preserved specimens). Disc grey-brown above, whitish grey below, edges of disc darker. A conspicuous U-shaped brown band between eyes just behind spiracle extends anteriorly around inner margin of orbit on each side, then posteriorly along outer margin. Upper surface of disc usually patterned with a few regularly arranged small white spots encircled by dark border.

In the type series the number of spots ranges from 0 (in three juveniles) to 9. Some spots spherical, others dumb-bell shaped. Position variable, usually in pairs in linear series; a single spot may occur between eyes, and any one of a pair may be absent.

Caudal fin darker than body of tail.

Iris of eye golden orange.

Dorsal spine translucent-white in adults, tinged with yellow in juveniles.

The above description is based on the specimens of the type series, both males and females. The holotype, A 334, a male, is distinguished by its spot pattern, one pair outside and almost level with front of eyes, a single spot between the eyes, one on left side behind the eye and a pair posterior to this.

Distribution. From material and records available the known range of *U. paucimaculatus* is from Portland, through Bass Strait, to a distance of 13 m. off the Victorian coast, into Port Phillip Bay, Westernport Bay, and off the Victorian coast at Lakes Entrance. The species is found in depths varying from 2-40 fathoms.

Breeding information. Specimens with young have been recorded on three occasions. One of the Westernport Bay specimens, A 345, gave birth prematurely to two young on 2nd May, 1967. In July of that year, Mr. B. Carthew of Portland sent in to the Museum a photograph of a female with four juveniles. On 6th October, 1968, A 337, taken from Zeally Pt., Torquay, produced six well formed young.

Affinities. The species *Urolophus paucimaculatus* is easily distinguished from the other Australian urolophids. Its spotted disc links it with such forms as *U. gigas, U. circularis* and

U. bucculentus; however, in both the number and arrangement of spots it can be distinguished from these species. There appear to be affinities with *U. viridis* and *U. lobatus*. In the former species, the greenish colour of the body and the absence of the small inwardly directed prominence on the hinder border of each nostril enable clear distinction from *U. paucimaculatus*. The conspicuous tentacle on the outer margin of the nostril in *U. lobatus* does not occur in *U. paucimaculatus*.

Acknowledgments. Thanks are due to the numerous collectors in the abovementioned paper, for their most valuable assistance in helping to provide a range of material; to Mr. G. P. Whitley for help in the initial stages of the work, and to Mr. F. Guy of the Royal Melbourne Institute of Technology for the photographs.

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TABLE I

Dimensions of Holotype A 334, in millimetres

Measurement No.	Part measured	Definition of part	Dimension in mm.
1	Total length	From snout top to caudal fin tip	366
2	Disc width	At maximum pectoral spread	235
3	Disc length (a)	Snout to posterior margin of pectoral fin.	205
4	Disc length (b)	Snout to inner pectoral margin	186
5	Snout-cloaca	Snout tip to cloaca centre	187
6	Tail length	Cloaca centre to tip of caudal fin	174
7	Tail width	Maximum, at insertion	20·5
8	Tail lateral fold	Anterior to posterior limits	70·8
9	Pelvic fin width	Maximum, each fin from posterior margin of cloaca	43·9
10	Pelvic fin length	From lateral insertion to inner posterior limit	52·4
11	Caudal fin	Maximum height	16·5
12	Preocular length	Snout tip to anterior margin of eyeball	52·8
13	Preoral length	Snout tip to mouth slit	50·1
14	Prenarial length	Snout to anterior rim of nostril	38·0
15	Internarial distance	Minimum separation of nostrils, at sides of nasal curtain	15·6
16	Nasal curtain—length	From front rim of nostril to posterior limit of curtain	12·9
17	Nasal curtain—width	Posterior width, left or right lobe	13·3
18	Mouth width	Between inner borders of lips	22·5
19	Eyeball length	Excluding surrounding tisue	12·1
20	Interorbital distance	Minimum, between innermargins of orbits	31·5
21	Interspiracular distance	Minimum, between innermost border of spiracles	31·4
22	Spiracle length	Maximum from front to rear rim	17·3
23	Distance between gill slits	Between lateral extremities	
	1st pair		57·5
	2nd pair		54·4
	3rd pair		51·3
	4th pair		46·1
	5th pair		37·1
24	Snout to gill slits	To outer edge of gill slits	
	1st pair		84·2
	2nd pair		90·5
	3rd pair		98·2
	4th pair		103·2
	5th pair		107·0
25	Clasper length	Lateral, to pelvic fin junction	13·5
26	Tail spine length	From base posteriorly, to apex	35·4
27	Tail spines—number	All visible and clearly defined spines	25

Plate I

Urolophus paucimaculatus sp. nov. Holotype, A 334, male, total length 366 mm., dorsal aspect

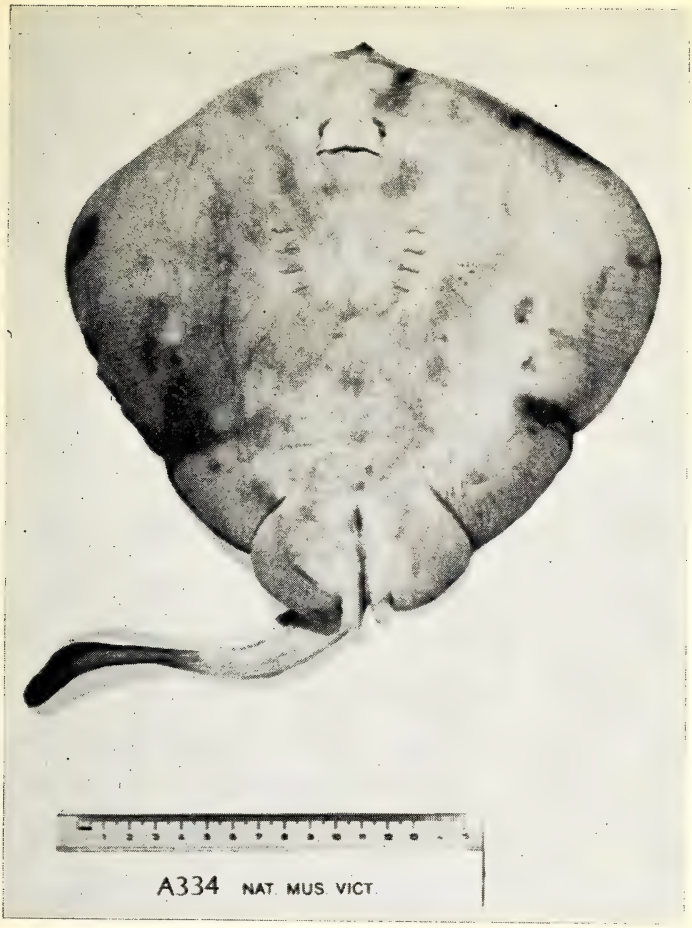

Plate II

Urolophus paucimaculatus sp. nov. Holotype, A 334, male, total length 366 mm., ventral aspect.

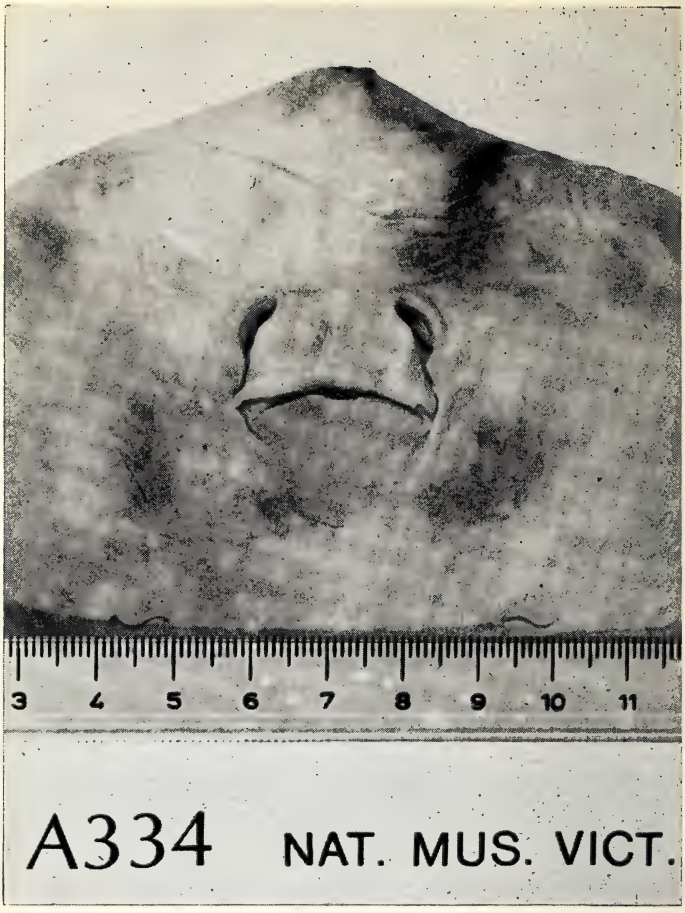

Plate III

Urolophus paucimaculatus sp. nov. Holotype, A 334, male, total length 366 mm., ventral aspect showing nasal apparatus.

continued from p. 10

species present in restricted sites and swamp gum (*E. ovata*) localized along stream courses.

Clifford's field observations showed that distribution was essentially dry sclerophyll forest on western slopes and wet sclerophyll forest on the sheltered eastern flanks. Although he recognized this major division between western and eastern slopes and in the south in the Sherbrooke Forest area, he failed to apply the same principle on a smaller scale, relating local climate (relief, aspect, exposure) uniformly to vegetation. Thus, on the eastern flanks both mountain grey gum and messmate, *E. obliqua*, are found well within Clifford's mountain ash region on areas that are relatively exposed to the north. Similar irregularities in distribution are present on the western slopes when wet sclerophyll species occur in favourable localities within the prevailing dry sclerophyll communities.

Field surveys during 1962-65 showed that within the 122 cm isohyet variations in temperature, insolation, cloud cover and windiness, chiefly resulting from differences in aspect and exposure, and changes in soil characteristics, especially soil type (krasnozem, podzol or skeletal), soil depth, and soil moisture retentivity were the chief controlling factors in species distribution (Tables 1 and 2).

Differences in actual distribution from that mapped earlier by Clifford were even more marked on the western flanks. This was especially the case in the basin where the tributaries of the upper reaches of the Dandenong

Figure 3

TABLE 1

Average temperature range, vegetation, soils, and cloud base for sites within the 120 cm annual average isohyet on the Dandenong Range near Burkes Lookout (temperature C°).

Month	N face	Station W face	Crest, just over S lee	S face
Dec (Summer)	45·8	46·6	34·8	24·4
Mar	33·9	35	19·5	16·7
June (Winter)	8·9	9·7	6·7	3·1
Sept	26·7	23·9	19·5	15
Vegetation	*Eucalyptus radiata* *E. obliqua*	*E. radiata* *E. obliqua*	*E. goniocalyx* *E. obliqua*	*E. regnans*
Soils:				
Krasnozem	„	„	*E. goniocalyx*	*E. regnans*
Podzols & Skeletals	„	„	*E. obliqua*	*E. goniocalyx*
Alluvial	—	—	*E. viminalis*	*E. viminalis*
Wet soil	—	—		*E. ovata*
Cloud base:				
Winter	Usually above 900 m	Usually above 900 m	Occasionally below 300 m	Commonly below 300 m
Summer	Usually above 900 m	Usually above 900 m	Usually above 700 m	Frequently below 300 m

Creek drain the western flanks of the Range. Although mapped by Clifford as supporting dry sclerophyll forest of messmate and narrow-leaf peppermint (*E. radiata*), with some mountain grey gum, this area chiefly supported mountain ash. Other species combinations replaced mountain ash on aspects open to the west or north.

What do the observed differences in patterns of distribution of mountain ash imply? It is well known that *E. regnans* usually occurs as a single species, even-aged stand and has a very narrow ecological tolerance. As was noted earlier this has been documented by various workers. Work on the synecology (Ferguson 1957) and the autecology of the species, and particularly studies of seedlings under both field and glasshouse laboratory conditions by Drangsholt (1956), Cunningham (1960) and Ashton (1956) have established certain critical limits for mountain ash. Broadly these involve moist conditions with annual average rainfall over 120 cm, absence of a long period of water stress, deep, well, but not excessively drained soils, shelter from drying winds and free air drainage because of frost intolerance of mountain ash seedlings. Cool temperatures do not appear limiting as the altitudinal range of the species is between 225-1,300 m, although it grows best between 450-1,050 m elevation.

Recognizing that habitat conditions favoring mountain ash were generally absent on the western flanks of the Dandenong Range, Clifford mapped all *E. regnans* as occurring east of the main divide with the exception of two very small areas west of Sassafras, where road access was good. Field investigations by the present writer showed that physical conditions supporting magnificent mountain ash forest in Sherbrooke Forest are not dissimilar from those in the burned catchment area of the upper Dandenong Creek in the southern lee of Burkes Lookout. In addition, conditions are similar to those present in

the two very small areas on the western flank, which were mapped by Clifford as supporting mountain ash.

Field evidence fully supported the belief that mountain ash had also been present in this area prior to the bushfire of Jaunary, 1962. (1) Leaves of mountain ash were found beneath fire-killed trees. (2) Nine months after the bushfire the trees remained starkly gaunt, bare and bleached whereas all trees other than mountain ash had regenerated green juvenile foliage from dormant, epicormic, adventitious shoots. This tallied with the known distribution of mountain ash on the eastern flanks where mountain ash was killed by the bushfire. Unlike most Eucalypts, *E. regnans* exhibits very weak regeneration, does not coppice freely and because of its thin bark is easily and usually killed by fire.

(3) It could be argued that the tall dead trees were not mountain ash but rather mountain grey gum killed by an extremely severe fire in that particular locality. However, there was an absence of the thick bark found on all mountain grey gum inspected throughout the entire burned area. Also, *E. goniocalyx* was present at the margins in the very narrow ecotone between *E. obliqua* and *E. regnans* where it could be expected to occur.

(4) In addition, on localized sites that were more exposed to wind and insolation than elsewhere within the mountain ash enclave and, where shallow krasnozems and podzols occurred, mountain grey gum was again present and vigorously regenerating. Thus, *E. goniocalyx* was present in all the local microhabitats where it normally occurs.

(5) Within the area of dead trunks occasional, isolated, fire-scorched but not killed *E. regnans* were present. Owing to some vagary of the fire-path or, perhaps due to localized less dense understorey scrub, radiant heat from the fire had caused leaf defoliation only. The characteristic slow very sparse regeneration of these isolated trees was unmistakable (Cochrane 1968b).

(6) The occurrence of *E. regnans* seedlings in some of the more open areas where sunlight was not shut off by dense undergrowth was one of the most conclusive arguments that this area of fire-killed trees was a former mountain ash community. Over much of the gentler slopes of the basin *E. regnans* seedlings, ranging in height from 1·3-3 m occurred at an average density of one per square metre three years after the fire. Seedlings were present but much less frequent on the steep slopes.

(7) Characteristic associated species of the Dandenong mountain ash communities such as *Olearia* spp., *Pomaderris, Pimelia, Pteridium,* and wire grass (*Tetrarrhena juncea*) were prominent among the regenerating understorey plants following the bushfire. Other species typically occurred with different *Eucalyptus* associations (Cochrane 1968b).

Furthermore, the pattern of plant species observed in this "enclave" was repeated immediately to the east where another similar but smaller, sheltered, south-facing area was present. In both these areas the distribution pattern of species was closely related to habitat conditions with *E. regnans* the most sensitive. Mountain ash distribution was influenced by a narrow set of environmental conditions. Wherever these appeared mountain ash vegetation was present. Beyond the basin on the north and west slopes *E. obliqua* and *E. radiata* replaced the mountain ash. Also, to the east beyond the protection of the western ridge *E. obliqua* replaced mountain ash on the spurs. In the lee of these spurs mountain ash reappeared.

TABLE 2

Frequency analysis of the direction of annual maximum wind gusts to 1962 at Melbourne. Directions not shown in the table each had zero annual maximum wind gusts.

Direction	N	NNW	NW	WNW	W	WSW	SW	SSE	NNE	E	SE
	11	4	6	3	2	3	4	1	1	0	0
			26			7		2		0	

The reasons for this enclave of mountain ash forest on the major western exposed flank of the Dandenong Range resulted from its protection in the southern lee of Burkes Lookout and also from the long ridge to the west giving the basin an eastern lee situation. Spot anemometer recordings showed that wind velocities were only 1·8-3 m s on the southern slopes supporting the mountain ash enclave when they were 3-4·9 m s in the immediate lee of the main crest, in mountain grey gum and 20-22·4 m s on the exposed northern and western slopes clothed with messmate and narrow-leaf peppermint. Recordings over the period of field investigations showed that wind velocities in the basin were normally only 1/7-1/5 those on the northern and western slopes.

Strong winds (over 13·4 m s) are predominantly northerly. Expressed as a percentage of total winds above 13·4 m s 75-80 per cent are from the north or northwest, and 90 per cent are from northerly or westerly quarters. Whittingham (1964) showed that annual maximum wind gusts essentially conform to a similar pattern (Table 2). No mountain ash occurs on the exposed windward sites even where soil and moisture conditions are favourable for its establishment.

The sheltered basin also experiences much less insolation that the northern and western slopes (Figure 1) and a generally milder temperature (Table 1). Temperature range is approximately half that of the exposed northern and western faces only a few metres away (Table 1). Minimum values at all stations were generally within a few degrees of each other but maximum values were much greater at stations outside the basin than those within it.

The relief, configuration and the general lack of wind in the basin serve to trap and hold low clouds. Frequently cloud base was down to only 300 m elevation in the sheltered southern lee during the winter months when the western slopes were swept free of clouds to over 900 m elevation. During summer, morning mists and low cloud were frequently present in the sheltered basin when northern and western slopes were receiving large amounts of insolation. "Forest smoke" (Rossmann 1952) often clung about the tree canopy in the basin for about one hour after rain but was not widely observed elsewhere on the western flanks. Thus, apart from the enhanced effectiveness of total precipitation on the southern slopes due to less total insolation and less evaporation through lower temperatures, precipitation may also have been increased by up to one-fifth or more from interception and fog drip (Linke 1921; Grunow 1955; Nagel 1956). This creates favourable growth conditions for mountain ash communities.

Within the perimeter of the sheltered southern slope mountain ash

was found only where deep, friable, free-draining but moist krasnozem soils were present. It was replaced by mountain grey gum where soils became shallower or drier. Mountain grey gum also grew on steep rocky moist faces with skeletal soil. Messmate was present on the shallower and drier skeletal soils within the basin, especially on the steepest slopes. Thus, within the Dandenong Range, mountain ash occurs naturally only where a narrow set of environmental conditions are present. Because of its narrow ecological valence its distribution can be accurately defined from an analysis of the environment.

After investigations showed that the distribution of *E. regnans* was closely related to local environmental conditions, the small scale field investigations carried out in the Dandenong Range were tested on a much larger scale in the rugged Otway Ranges in southern Victoria.

Blue gum (*Eucalyptus globulus*), mannah gum (*E. viminalis*), messmate, mountain grey gum, and mountain ash form important distinct communities, each reflecting varying degrees of environmental control (Cochrane 1968a). Mountain ash occupied similar closely defined environmental parameters to those measured in the Dandenong Range. Detailed field investigations embracing a wide range of different site conditions showed a remarkably close relationship between species distribution, precipitation totals, the height of the cloud base and associated cloud drip, the prevalence of fog, the degree of exposure to wind and insolation, and soil conditions. *E. regnans* occurred where optimum climatic site conditions similar to those recorded in the Dandenong Range were present but it was absent in such localities if soil conditions were not favourable. Shallow soils, or overmoist, or very free-draining soils did not support *E. regnans*.

At elevations around 500 m and above, where rainfall was over 125 cm and cloud base frequently below 300 m mountain ash was found on all aspects if such locations were not very exposed to winds. In such areas shallow soils were less limiting as they usually remained moist. In areas exposed to strong hot or strong cold winds mountain ash was replaced by other species.

Ground control traverses in the Otway Ranges were located on vertical air photograph stereographic pairs to determine how accurately structure, texture, shade, patterns and other photographic properties could be analyzed for the wider mapping of sclerophyll forest communities. Measured field data showed that mountain ash vegetation in the Otway Ranges was closely related to environmental conditions. This information related to observed patterns on the vertical air photographs proved a reasonably successful method for mapping vegetation distributions over the difficult country of the Otway Ranges. *E. regnans* communities demonstrate Boyko's (1947) geoecological law of distribution that the micro-distribution of an ecotypic plant or of a plant community is a parallel function of its macro-distribution.

The specific topographical distribution (micro-distribution) of mountain ash in the sheltered area south of Burkes Lookout and its general geographical distribution in the Dandenong and Otway Ranges, and elsewhere in Victoria and Tasmania are all determined by the same ecological amplitudes. Thus, the distribution of naturally occurring mountain ash communities can be determined from an analysis of environmental characteristics, many of which can be readily interpreted from topographical maps and vertical air photographs.

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(To be removed)

General Meeting—9 December, 1968

The Herbarium hall was full and the President Mr. E. R. Allan was in the chair.

The minutes of the previous meeting were taken as read on the motion of Mr. Woollard and Mr. Morrison.

The President presented a certificate of honorary membership of the F.N.C.V. to Miss Mary Bull, who has been a member for 40 years. In responding, Miss Bull expressed her pleasure in receiving the certificate. She said that although she hasn't been recently very active in the club, at the beginning, when she joined, she scarcely missed an excursion or a meeting. She has thoroughly enjoyed and appreciated all that she has received from the club. When she first came from England, she was expected to teach Botany, but despaired at having to take excursions as the native plants were unknown to her. She was recommended to go to the Botanic Gardens for assistance, and she saw Mr. St. John who advised her to join the F.N.C.V. and learn of the flora. He and Miss Janet Raff proposed her for membership and she went on the first excursion with Mr. Tadgell and enjoyed a wonderful and totally new experience, with billy tea at Hurstbridge. She often took her students over the same area, telling them what Mr. Tadgell had told her.

Four new members whose names appear in the December *Naturalist* were elected on the motion of Miss Allender and Mr. P. Curliss.

The Secretary said that he had received a letter from the 15th Brighton Scout Troop, asking for someone with knowledge of natural history to help them at their Camp at Gilwell Park on 29th December or 3rd January. Mr. Swaby and Miss M. Elder offered to help.

A letter from Wodonga was received asking for information on forming a Naturalist group.

The members were reminded that the Treasurer Mr. D. McInnes is ready to receive annual subscriptions due on January 1st, 1969.

The President read the report by Mr. McInnes on the Nature Show balance which showed a profit of $384. Of this $30 went to the Hawthorn Juniors and of the remainder one third was for the S.G.A.P. and two thirds for the F.N.C.V.

Miss Woollard has copies of "Insect Wonders of Australia" for 12c—the proceeds for the Junior Naturalist Club.

The President announced that nominations for the Council must be made next meeting, and that he would be away next year and would not be available for nomination.

The Subject for the evening was "Wild Flowers of the North" by Mr. Alan Morrison. He showed on the screen a map of the areas covered in the north of South Australia, in the Northern Territory, and the N.E. of Western Australia on more than one trip; which included the Everard Range, Ellery and Ormiston Gorge, and on another trip through Alice Springs, the Devil's Marbles, Tennant Creek, Mataranka, Katherine Gorge, Berry Springs, Darwin, Daly River Crossing, back to Katherine, Timber Creek, Kununurra, and the Ord River back through Timber Creek to Jasper Gorge and Victoria River Downs, and then back to Alice Springs.

Magnificent slides of the areas, and of the plants and animals seen were projected by Mr. Ian Morrison.

The emblem of South Australia—Sturt's desert pea (*Clianthus formosus*), plentiful this year, made a fine introduction.

The red weathered granite boulders of the Everard Range, the masses of pink everlastings (Schoenia), yellow everlastings, the large yellow guinea flowers of *Hibbertia glaberrima, Rulingia grandiflora* with pink flowers, the porcupine grass (Triodia) in full flower, and concealing its painful spiny leaves, a lovely pink spotted *Eremophila alternifolia,* white *Goodenia calcarata,* the brilliant red fleshy persistent sepals of *Eremophila calysina,* a creek bed with white barked Eucalypts harbouring parrots' nests all showed a grand array of beauty. A spotted gecko and the bower of a bower bird added life to this display.

The Corkwood tree—*Hakea lorea* with its spikes of cream flowers and rough corky bark contrasted with the tessellated bark of a bloodwood—*Eucalyptus terminalis.*

Of the twelve kinds of Hibiscus seen, *Hibiscus farragei* occurred in this locality. Striking patterns on the red earth were made by a white *Helipterum,* and the spreading ropy inflorescences of *Dysphania,* and big green pussytail heads of *Ptilotus macrocephalus.*

A picture of a red dusty bare track with dying mulga in a drought year was contrasted with a similar area this year after good rains showing the ground almost covered with flowers, (the geologists complaining that they could not see the

gibber). *Goodenia grandiflora* was well named. It is a 4 ft. high shrub.

At Daly River crossing a big salt water crocodile was seen but not photographed. The smaller fresh water protected crocodiles were seen at the Roper and Katherine and Ord rivers.

A disused copper mine was visited and a swamp with brolgas was viewed from this site.

A large pink hibiscus and a brilliant yellow one grew near the Daly.

Above Timber Creek store, native paintings were photographed showing horizontal figures.

Beyond this, Boab or bottle trees, some leafless, some leafy, were an outstanding feature—the large gourds and seeds being edible.

The Ord River with the brilliantly red hills at Kununurra were shown. Here two carnivorous plants were seen—*Drosera indica* having long narrow leaves with sensitive digestive hairs, and the pink-lilac flowered *Byblis*, having sticky but not sensitive hairs, as well as digestive glands on the stems and narrow leaves. The high cliffs of Jasper Gorge from which aborigines used to throw spears at the cattlemen overlook a chain of water holes. Two types of large cleverly constructed mason wasps' nests were noticed.

A small tree with spherical orange like fruits was *Strychnos lucida*. Birds eat the fruit and discard the poisonous seeds.

Acacias showed a great variety of forms from large very wide "leaves" to one with whorls of tiny "leaves" with thread-like points.

Amongst the great variety of beautiful hibiscus species *Hibiscus goldsworthyi* was remarkable with its yellow flower and densely hairy finely prickled leaves.

Pink *Calytrix microphylla* was a common shrub in many areas.

At Victoria Rivers Downs a warning was posted against a creeper with pods having bright red shiny seeds with black tips. This is *Abrus* containing abrin—the most potent poison known, which would cause death if the seeds were broken and eaten. The seeds were often used for beads. This plant was found on the trip.

The talk ended with a picture of the floral emblem of the Northern Territory —Sturt's desert rose—*Gossypium stuartianum*. The President thanked Mr. Morrison for his most interesting talk and the beautiful slides, and this was supported by enthusiastic applause from the large audience.

Mrs. G. Taylor announced a camping weekend on Dargo High Plains arranged by Miss Nancy Rossiter and Miss Jean Galbraith on Australia Day weekend. The road taken will be via Fernbank. Mrs. Taylor drew attention to articles on Nature Conservation in the Christian Science Monitor with 15 weekly episodes. Mr. Hanks said that he had arranged for twelve members to take part in the January Members' Night.

Nature Notes and Exhibits

Mr. Ken Strong asked for information on Moths collected at Balnarring—the male being small and grey and the female larger and steel blue. Mr. F. Morley showed mud nests of the fairy martin. These were given to him by the owner of the property at Deniliquin. These birds were not seen in the area before irrigation. Nests were built under a culvert in a water pipe with only 15 inches clearance —thousands of mud pellets made the 10 inch long nests. He said that Charles Barrett claimed that a group of birds combined to build a nest. If so who would be the rightful owner?

Mr. A. J. Swaby brought *Pratia pedunculata* (Trailing Pratia) which is usually prostrate, but this specimen was growing upright under a verandah by a wall facing north—presumably a reaction to the direction of light. He also showed *Pratia surrepens* (Alpine Pratia), *Mentha saturejoides* (creeping mint), *Hydrocotyle geranifolia* (forest pennywort) and garden grown *Calothamnus quadrefidus* (WA), *Prostanthera lasianthos* (Christmas bush) and *Melaleuca pulchella*.

Mr. Ian Morrison brought a growing green flowered slender leek orchid—*Prasophyllum gracile* from Tonimbuki. This differs from *P. frenchii* in having a distinctly stalked ovary.

Mr. D. McInnes exhibited a marine spider like *Pycnogonida* showing a prominent proboscis on front, very little evidence of a body, 8 long legs with apparently branches of the intestine going down each leg.

He also showed a microscope tube from Russia, and appealed for any unused club microscopes that the owners would sell, as there is a demand for them.

F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETINGS

Monday, 13 January—Members' Night. Organized—Mr. E. Hanks.

1. Minutes, Reports, Amendments.
2. Correspondence.
3. Subject for the evening—"Members' Night".
4. New Members

   Due to there being no F.N.C.V. Council Meeting during December, applicants for membership during this month, will be listed in the February *Victorian Naturalist*.
5. General Business.
6. Nature Notes and Exhibits.

Monday, 10 February—"Echidnee". Dr. E. M. H. Ealey.

GROUP MEETINGS

8 p.m. at National Herbarium unless otherwise stated.

Wednesday, 15 January—Microscopical Group.

Friday, 31 January—Junior meeting at Hawthorn Town Hall at 8 p.m.

Monday, 3 February—Marine Biology and Entomology Group meeting in Mr. Strong's rooms in Parliament House at 8 p.m.

Wednesday, 5 February—Geology Group.

Thursday, 6 February—Mammal Survey Group.

Friday, 7 February—Junior meeting at Rechabite Hall, 251 High Street, Preston at 8 p.m.

Thursday, 13 February—Botany Group.

F.N.C.V. EXCURSIONS

Sunday, 18 January—Tooronga Falls. The coach leaves Batman Avenue at 9.30 a.m.; fare $2.00. Bring two meals.

The La Trobe Valley F.N.C. invite members to join them in a camp out at Dargo High Plains on 25 and 26 January, 1969. Transport is by private car, all necessities to be taken, and although there is a pleasant stream at Laubeys Plain where we shall camp, it would be wise to carry drinking water.

Some members will travel on Friday, 24 January. Take the road via Fernbank. Laubeys Plain is beyond Treasures Homestead as one travels from Gippsland. Treasures is the only house on the high plains and following the road past it the camp area will be near the stream, probably on the left.

29 August-21 September 1969—It is hoped to have an excursion to Western Australia at this time if sufficient members are interested. The party would leave by train Friday evening and arrive in Perth on Monday morning. A coach would be chartered and the party would travel to the Geraldton area for a few days, then south to Albany across to Busselton and back to Perth to catch the return train on Thursday arriving back in Melbourne on Sunday 21 September, 1969. Accommodation would be on a Dinner, bed and breakfast basis and members would be responsible for their own lunches. The cost would depend upon the number going but should not exceed $260.00 for train, coach and accommodation. As this trip will be dependent upon enough members wanting to go, those interested should notify the excursion secretary as soon as possible.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron: His Excellency Major-General SIR ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

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Group Secretaries:

Botany: MISS M. BUTCHART, 23 Loch Street, Hawthorn East 3123 (82 1616).

Geology: MR. T. SAULT, 9 The Avenue, West Rosebud.

Microscopical: MR. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

Mammal Survey: MR. P. HOMAN, 40 Howard Street, Reservoir 3073

Entomology and Marine Biology: MR. J. W. H. STRONG, Legislative Council, Parliament House. Melbourne 3002.

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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